



Highway Maintenance Manual

Bureau of Highway Maintenance

Chapter 9 R/W Use & Permits

August 2014

Section 15 Utility Accommodation

Subject 45 Construction

1.0 General

Utility construction is comprised of many different components. Smaller items are detailed in section 1. More specific items are detailed in sections 2-5.

1.1 Permit at the Job Site

A complete copy of the permit WisDOT issues to a utility for its proposed work shall be in the possession of the utility's work force, consultant, contractor or subcontractor at all times when work is being performed within the right-of-way (R/W). This includes a copy of WisDOT's approval for a service connection under an Expedited Service Connection Permit (see [HMM 09-15-20](#)) when appropriate

1.2 Use of Highway Median

Any use of a highway median is prohibited unless specifically authorized by a permit. See [HMM 09-15-25, 7.1](#) for specific conditions that shall be met if median work is permitted.

1.3 Use of Temporary Guard Poles

No guard pole shall be set within the R/W unless specifically authorized by a permit. By definition, a guard pole is used to prevent aerial lines from falling onto the traveled way. Any guard poles permitted in the clear zone shall comply with [HMM 09-15-25, 3.1](#)

1.4 Unexpected Field Conditions

Any modification of the terms of the approved permit to meet changed or unexpected field conditions shall require prior approval from WisDOT.

1.5 Blasting

Blasting on the R/W is prohibited unless specifically authorized by a permit.

1.6 Traffic Signs

Do not remove any traffic sign (Figure 1) unless approved in a permit. This includes guide signs, warning signs, route markers, street names, etc. If needed, erect temporary traffic signs to guide motorists while the utility work is occurring.



Figure 1: Improper Sign Removal

1.7 Work Site Cleanup

Remove all debris, refuse and waste resulting from the utility's activities from the site and the motorists' view unless otherwise provided by the permit. Do not burn cuttings, brush or other debris within the R/W limits. Trees and other vegetation may be chipped and used as mulch if approved in a utility's permit.

1.8 Work Start and Completion Notices

If checked at the bottom of a utility's approved permit, contact the WisDOT utility permit coordinator listed on the permit form at least three days prior to starting the work. File written (e-mail or fax okay) notice of completion of the permitted work and restorations within **10 calendar days** with the same person. WisDOT may use the sample form in [Attachment 1](#) to assist with these notices.

2.0 Tree/Vegetation Control

Utilities are prohibited from chemical treating, cutting, trimming or damaging trees/vegetation on state highways to facilitate the installation of its facility unless specifically authorized by a permit or except as provided under maintenance type activities. See [HMM 09-15-15, 3.0](#). Trees/vegetation proposed to be damaged or destroyed may have to be replaced at WisDOT's discretion. When tree removal is permitted, remove each stump and properly backfill the hole. Cutting the stump flush with the ground may also be allowed upon WisDOT approval.

Compensate WisDOT for the loss of trees on electric transmission line projects unless specified in the utility's permit. Replace trees 2" DBH (diameter at breast height) and greater that are damaged or destroyed at a 2:1 ratio (replaced:destroyed) and a 1:1 ratio below 2" DBH. If low-growth trees cannot be planted at the same location as the transmission line, then WisDOT may require the utility to plant trees in alternate locations or pay WisDOT an agreed to price per tree. This price may be established by an appraisal or by values determined with past permits issued, which is currently \$200/tree.

Be aware of rare or endangered plant species, animal and insect species that feed off of native vegetation, and invasive species that must be protected or avoided by law. Contact a local Department of Natural Resources office or a region utility permit coordinator to receive assistance in identifying these areas in the R/W. The Karner Blue Butterfly, for example, is currently an endangered species that feeds off the wild lupine plant. See <http://dnr.wi.gov/topic/forestplanning/karner/habitat.html>. In addition, exercise special care when handling ash trees due to the Emerald Ash Borer. See <http://datcpservices.wisconsin.gov/eab/index.jsp>

3.0 Construction Methods

Section 3 details various construction methods that a utility may use during its work.

3.1 Trenched Construction

Trenched construction and backfill shall provide for the:

- 1) Restoration of the structural integrity of the highway facility (see [Attachment 2](#)),
- 2) Security of the facility against deformation likely to cause leakage,
- 3) Assurance against the trench entrapping excessive moisture or becoming a drainage channel, and
- 4) Assurance against highway drainage being blocked by the backfill.

When necessary, backfill trenches for underground utility facilities with pervious material and provide the necessary outlets to prevent water entrapment. This may also include the construction of underdrains.

The utility installation shall conform to WisDOT's applicable [Standard Specifications for Highway and Structure Construction](#), current edition, for earthwork, culverts or other utility work within the R/W.

WisDOT may require that backfill and repaving be performed by county forces or under its direction at the expense of the utility.

3.2 Untrenched Construction

Use untrenched construction for all underground utility crossings of all highways that have a paved surface and are open to traffic unless specifically authorized in the permit. Special restoration methods are required If open cutting of pavement is allowed. See [5.2](#).

Accomplish untrenched installation of utility facilities by tunneling, driving, coring, directional boring and/or dry boring (augering). Water boring under a highway is prohibited unless specifically authorized in a permit. Specify the boring method on a utility permit application (See question 12). Using a manually tracked bore head is prohibited when crossing a major highway like an Interstate or other high-speed multi-lane highway.

Boring shall result in a close fit to the facility being installed. As a minimum, extend untrenched construction beneath the entire highway prism (from toe of inslope to toe of inslope or from back of curb to back of curb). Locate ground openings or pits for such work outside the clear zone and do not interfere with highway drainage.

When specifically authorized by WisDOT, the extent of the untrenched crossing may be reduced or eliminated where such construction methods are impractical or physically restricted by the terrain.

3.3 Subsurface Utility Excavation (SUE)

WisDOT allows SUE as a necessary tool for accurate vertical location of utilities. Two methods are available: air (vacuum) and water (jetting). Within the pavement structure (lanes, shoulders, curb & gutter), use **air** SUE rather than water. Water may be allowed if the air method cannot penetrate frozen and/or densely compacted soil. Air or water SUE may be used in other R/W areas beyond the pavement structure. Table 1 below outlines the basic steps for SUE work.

Consult WisDOT prior to using water SUE. If WisDOT agrees to its use, check the SUE water jetting box on the permit application and show hole locations on a drawing. Submit **before** pavement condition pictures at each SUE hole with the permit application, and provide pictures of the fully restored holes **after** the job is completed. This provides WisDOT and the utility with documentation that the restoration was finished. Monitor the holes over the next few years, or until WisDOT is satisfied that no additional settling is occurring or until a new resurfacing or pavement replacement project is done. A utility must repair any SUE hole settlement (Figure 2).

Numerous pictures are not needed. But pictures should be taken from the same angle and distance for the before and after conditions, and be far enough away to provide some sort of perspective for the location (i.e., not right next to the hole). Take pictures with a digital camera so they can be sent electronically, or if taken with a conventional camera, scan and send to WisDOT in a .jpg or .pdf format. No pictures are required for air SUE.

Use round cores for SUE holes within the pavement structure. Round cores are preferred since they prevent stress cracks due to elimination of corners. The maximum size of a SUE hole is 12" in diameter in the wheel paths and a maximum of 16" in diameter outside the wheel paths. Beyond the pavement structure, the hole size may be larger (18"-24") and square upon WisDOT approval.

Table 1: Basic SUE Steps

- 1) Pavement is saw cut full depth, with a bit ranging from 12" to 16" in diameter; resulting in a "core".
- 2) The core is removed and saved for reuse (if structurally sound).
- 3) A protective steel ring is placed to protect the edge of the opening from damage.
- 4) Vacuum equipment is used to excavate compacted material from bottom of base course down to beneath utility facility.
- 5) Utility work is performed (e.g., leak repair, service connection).
- 6) Utility facility is protected with fine material.
- 7) Self-mixing flowable fill material is placed from top of fine material to bottom of base course (fill is designed to be traffic-bearing in 90 minutes).
- 8) Non-shrink grout is placed (grout is designed to be traffic-bearing in about 90 minutes).
- 9) The removed core (or a generic equivalent replacement core) is placed in the remaining opening (original alignment and orientation is maintained if removed core is used) forcing the grout to the surface to fill the annular space and core extraction hole.
- 10) The restored opening is sealed.



Figure 2: Improper SUE Restoration

3.4 Non-Metallic Lines

Any non metallic pipe, cable or other kind of utility line which lacks a continuous and integral metallic component capable of detection by locating instruments shall be accompanied in its location by a continuous detectable metallic tracer wire or metallic tape.

3.5 Casing

Where crossings by underground lines are encased in protective conduit or duct, the encasement shall extend at least two feet beyond the toe of slope or three feet beyond the ditch line. On curbed sections, it shall extend at least outside the outer curbs.

4.0 Work Site Safety

The utility is responsible to secure its work site from any hazard to the public at all times until all work is done. Monitor vehicles, equipment and materials in active use at the work site to ensure consistently safe conditions.

WisDOT may require sheeting, shoring, bulkheads, temporary/permanent concrete barrier, etc. if considered necessary to protect the highway and the traveling public.

4.1 Equipment/Materials Storage

Store utility equipment and materials located at the work site but not in immediate (same day) use in a safe location off the R/W. If this not practical, then the equipment or materials may be stored beyond the clear zone and as close to the fence or R/W line as possible.

4.2 Vehicle/Equipment Visibility

Vehicles and equipment shall have their high intensity flashing (strobe or revolving) and hazard warning lights operating when they are within the clear zone during work operations.

4.3 Safety Garments

All WisDOT, county, utility, consultant and contractor personnel who are out of their vehicles and within the R/W shall wear their Type 2 or 3 retro-reflective safety garments at all times.

5.0 R/W Restoration

A utility shall be responsible for restoring the highway and the adjacent R/W to its original (as close as possible) condition within **two weeks** after completing the facility installation. Exceptions may be allowed (e.g. for bad weather) with prior approval from WisDOT. Failure of the utility to make prompt and satisfactory restorations of the highway or adjacent R/W may cause WisDOT to arrange for restoration by others at the utility's expense.

Restore any curb, gutter, pavement, shoulder, sidewalk, driveway, gravel base, ballast, or other highway element disturbed to the qualities, grades, compactions, conditions, etc., in accordance with WisDOT's [Standard Specifications for Highway and Structure Construction](#), current edition. See [5.2](#) for additional requirements for pavement restoration. Any subsequent heavings, settlings, or other faultings attributable to the permitted work shall be repaired in a manner satisfactory to WisDOT at the utility's expense. Use [Attachment 2](#) as a guide for backfilling excavations. Avoid situations as shown in Figure 3.

Restore any disturbed turfed area in the R/W with at least 4" of topsoil, and reseed with perennial grass or sod to the satisfaction of WisDOT. See section [2.0](#) for details on trees or vegetation restoration. Once restored, the utility shall maintain turfed areas, trees and vegetation until they achieve sustained growth.

If, in WisDOT's opinion, the permitted works or facilities are found to obstruct highway drainage, unduly increase the difficulty of highway maintenance, or in any other manner adversely affect a highway interest, the utility shall, upon notice, cure the fault as directed and restore the highway facility to the satisfaction of WisDOT.



Figure 3: Examples of Improper R/W Restoration



5.1 Poles and Anchor Rods

Completely remove replaced poles from the highway. No replaced pole shall be allowed to remain, in whole or in part, nor shall it be sawed off. The pole's hole shall be properly backfilled and compacted. All anchor rods shall be removed or cut off one foot below ground level.

5.2 Pavement Restoration Requirements

Sawcut all pavement full-depth when open cutting. See [Attachment 3](#) for examples when pavement is not sawcut.

Concrete pavement shall be restored in conjunction with WisDOT standard detail drawing [13C9](#). Avoid creating additional joints when possible. The minimum dimension for a patch will be 6' by the full lane or shoulder width. High early strength concrete may be specified when needed. Additional guidance on concrete pavement repair can be found in [FDM 14-25-10, Exhibit 10.1](#).

The minimum dimension for an asphaltic concrete patch will be 6' by the distance to the nearest joint or seam. Use hot mix asphalt whenever possible. If cold patch is needed in an emergency, replace with hot mix as soon as possible. Figure 4 below shows improper asphaltic pavement restoration.



Figure 4: Both patches improperly backfilled and compacted and not patched to the nearest joint or seam.

6.0 Temporary Driveways for Utility Construction

Do not build temporary driveways for utility construction unless WisDOT has granted prior approval. If a temporary driveway is needed, submit a separate STH connection permit application [dt1504](#) for WisDOT review along with the utility permit application. The reason(s) for needing the temporary driveway should be included on both applications. A temporary driveway may not be approved, so utilities are advised to have a contingency access plan. Do not locate a temporary driveway within the functional area of an intersection. See Figure 5 for an example.

Existing driveways may be used for utility construction as long as permission is obtained from the property owner. A STH connection permit is not required unless there will be a significant change in use, e.g., an agricultural driveway will experience heavy truck traffic or a major increase in the number of vehicle trips per day. In this situation, submit a STH connection permit to make temporary modifications to the driveway.

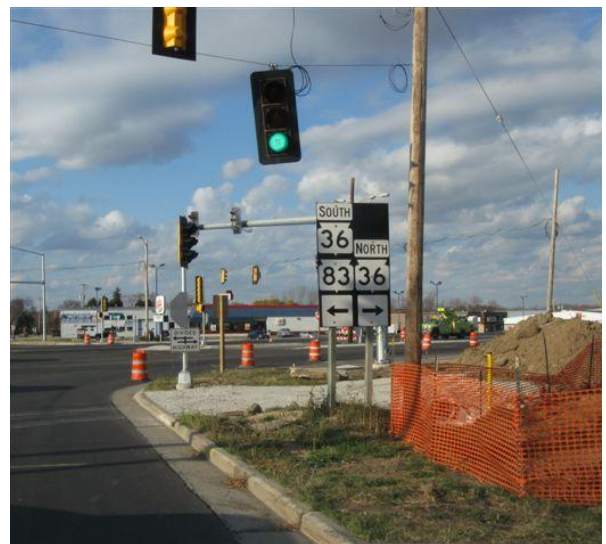


Figure 5: Temporary driveway within intersection.



Attachment 1: Sample Start and Work Completion Notice



Utility Permit Start Work Notice

Provide all information and e-mail or fax to the utility permit coordinator or other region contact listed on the approved permit form **a minimum three working days** prior to the start of the work. When restoration is complete and ready for inspection, e-mail or fax to the same contact.

WisDOT Utility Permit Number:

SOUTHWEST REGIONMark Goggin mark.goggin@dot.wi.govFax: 608-243-3380 Madison office
608-789-7896 La Crosse office

Utility Job Number:

SOUTHEAST REGION

Rodrigo Martinez

rodrigo.martinez@dot.wi.gov

Fax: 262-521-4425

SE Utility Permit Unit General Email:

dotdtsdseutilitypermits@dot.wi.gov

Utility Company:

Utility Contractor Contact
Name and 24-Hour Number:
NORTHEAST REGIONRay Drake ray.drake@dot.wi.gov

Fax: 920-492-0144

NE Utility Unit General Email:

dotdtsdneutilitycoordination@dot.wi.govTraffic Control Provider and
24-Hour Number:
NORTH CENTRAL REGION

Keith Rutkowski – Wis Rapids office

keith.rutkowski@dot.wi.gov

Fax: 715-423-0334

Construction Start Date:

Terry Catlin – Rhinelander office

terry.catlin@dot.wi.gov

Fax: 715-365-5780

Construction Completion Date:

NORTHWEST REGIONVicki Riepl vicki.riepl@dot.wi.gov

Fax: 715-635-2309

NW Utility Permit Unit General Email:

dotdtsdnwecpermitcoordination@dot.wi.gov

Completion Notice

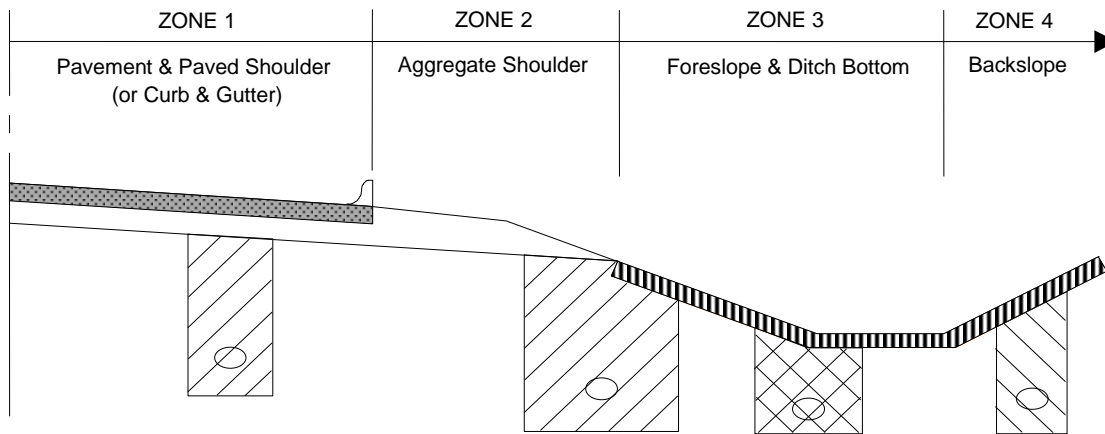
Restoration is complete and ready for inspection. File notices within **10 calendar days** of restoration completion. Restore within **two weeks** from completion of utility construction.

Restoration Completion Date:

Attachment 2: Backfilling Excavation Detail Drawings



LONGITUDINAL EXCAVATION

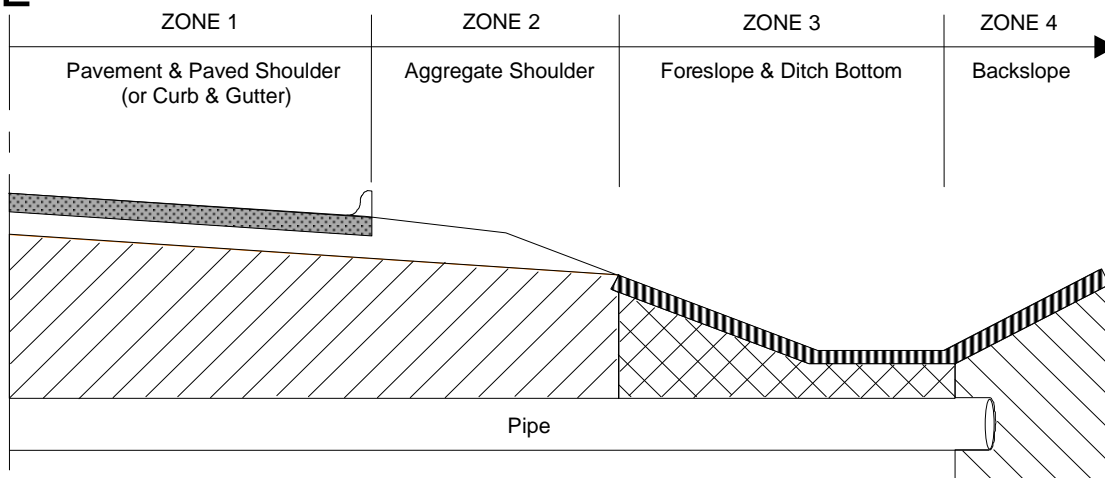


KEY

	Slurry Backfill
	Granular Backfill
	4" Topsoil
	Spoil backfill



TRANSVERSE EXCAVATION



NOTES

- 1) Use slurry backfill to replace the excavated material in ZONES 1 and 2.
- 2) If the work area covers BOTH ZONES 2 & 3, use slurry backfill to replace the excavated material.
- 3) Use granular backfill to replace the excavated material in ZONE 3. Granular backfill placement and gradation shall conform to WisDOT's Standard Specifications for Road and Bridge Construction, current edition.
- 4) Place backfill in ZONES 3 & 4 to within 4" of the finished grade to allow for topsoil placement.
- 5) Suitable spoil backfill may be used in ZONE 4 at the discretion of WisDOT.

SLURRY BACKFILL

The materials shall be placed in a clean concrete mixer truck and thoroughly mixed in the following quantities FOR EACH CUBIC YARD REQUIRED:

- SAND 1,350 lbs
- #1 STONE 750 lbs
- #2 STONE 1,150 lbs
- WATER 25 gals (0 to -0.5 gal variance)

No additional water will be allowed. The above weights are damp weights. Just prior to placing the slurry backfill, the mixer shall be run at mixing speed for one full minute to assure an even mixture.

Attachment 3: Pavement Restoration Examples

Figure 1a: Excavation with planned sawcut¹

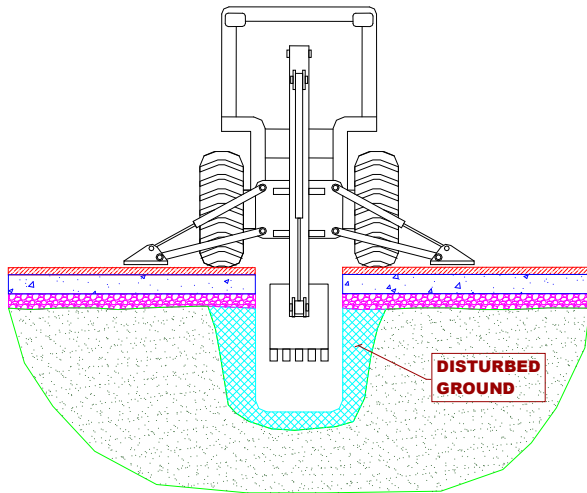


Figure 1b: Actual excavation without sawcut

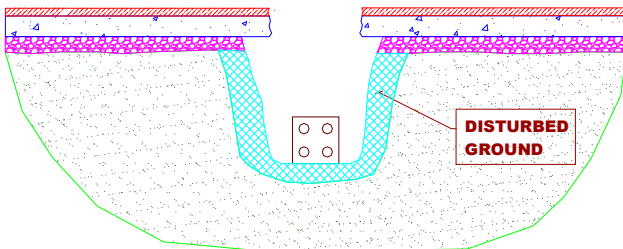


Figure 1c: Trench backfilling without slurry

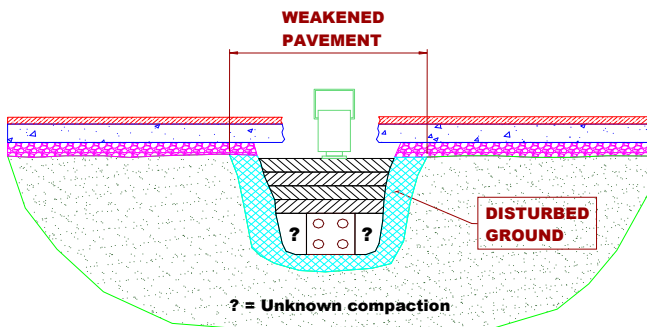


Figure 2: Concrete pavement repair without sawcut. Note top of pavement edge and missing dowel bar. In lower picture, dowel bars in gutter are bent and not ready to accept slurry.



¹ Drawings courtesy of CNA Consulting Engineers